

*Curriculum Vitae*

CHARLES S. (CHARLIE) ZENDER

Department of Earth System Science  
University of California, Irvine  
Irvine, CA 92697-3100

Voice: (949) 891-2429  
Fax: (949) 824-3874  
E-mail: [zender@uci.edu](mailto:zender@uci.edu)

**PROFESSIONAL APPOINTMENTS**

- 7/05– Associate Professor of Earth System Science, University of California, Irvine
- 8/07–8/08 Visiting Researcher, Laboratoire de Glaciologie et Géophysique de l'Environnement (CNRS/LGGE), Grenoble, France
- 3/00–2/06 Affiliate Scientist of the Climate and Global Dynamics (CGD) Division, National Center for Atmospheric Research (NCAR), Boulder, CO
- 7/99–6/05 Assistant Professor of Earth System Science, University of California, Irvine
- 7/98–6/99 Visiting Scientist in Atmospheric Chemistry and CGD Divisions, NCAR
- 7/96–6/98 Postdoctoral Fellow, Advanced Studies Program, NCAR
- 8/91–6/96 Graduate Research Assistant, University of Colorado at Boulder
- 1/91–6/91 Visiting Faculty in Physical Sciences, College of the Atlantic, Bar Harbor, ME
- 11/89–12/90 Physicist, Technician, Smithsonian Astrophysical Observatory, Cambridge, MA

**PROFESSIONAL PREPARATION**

Harvard University	Physics	A.B.	1990
University of Colorado at Boulder	Astrophys., Planetary, and Atmospheric Sci.	M.S.	1993
University of Colorado at Boulder	Astrophys., Planetary, and Atmospheric Sci.	Ph.D.	1996

**TEACHING AND RESEARCH OVERVIEW**

My primary responsibilities are teaching and research. I teach undergraduate and graduate courses on climate and physics, and graduate seminars on physical climate modeling. My research group studies the distribution and fluxes of energy and trace species that pass through Earth's atmosphere. We model the microphysics of trace gas, aerosol, and surface interactions with Earth's radiative, thermodynamic, and chemical budgets. We then parameterize these effects in climate system models. Model simulations, combined with lab, field, and satellite data, help us attribute alteration of Earth's climate, chemistry, and atmospheric composition. Our current research includes mineral dust, meteoric, and carbonaceous aerosols, snow lifecycle and albedo, aerosol impacts on ocean biogeochemistry, wind-driven surface energy/mass exchange, climate-disease links, and terascale data analysis. Our natural aerosol generation, aerosol light scattering, column radiative transfer, and data processing models are freely available and are used in geoscience research institutions world-wide.

MANUSCRIPTS IN PEER-REVIEW (\* = graduate student, † = post-doc, ‡ = researcher)

- PR3. \*Tosca, M. G., J. T. Randerson, **C. S. Zender**, M. G. Flanner, and P. J. Rasch (2009), Do biomass burning aerosols intensify drought in equatorial Asia during El Niño?, *Submitted to Atmos. Chem. Phys.*. ([PDF](#))
- PR2. †Wang, X., and **C. S. Zender** (2009), Correcting the MODIS snow albedo bias in Greenland based on *in situ* GC-Net albedo measurements: Implications for the surface energy budget, *Submitted to J. Geophys. Res. Earth Surf.*. ([PDF](#))
- PR1. Reyerson, P., M. S. Blinnikov, A. J. Busacca, D. R. Gaylord, R. Rupp, M. R. Sweeney, and **C. S. Zender** (2009), Phytolith Concentration and Morphotypes in Modern Soils of the Columbia Basin, USA as Indicators of Vegetation Composition and Cover, *Submitted to J. Arid Env.*. ([PDF](#))

PEER-REVIEWED CONFERENCE PROCEEDINGS

- PC2. \*Wang, D. L., **C. S. Zender**, and S. F. Jenks (2008), Cluster Workflow Execution of Retargeted Data Analysis Scripts, in *Cluster Computing and the Grid, 2008. CCGRID '08. 8th IEEE International Symposium on. Lyon, France, 19–22 May, 2008*. IEEE Computer Society, 449–458, doi:10.1109/CCGRID.2008.69. ([PDF](#))
- PC1. \*Wang, D. L., **C. S. Zender**, and S. F. Jenks (2007), Server-side parallel data reduction and analysis, in *Advances in Grid and Pervasive Computing, Second International Conference on, GPC 2007, Paris, France, May 2–4, 2007, Proceedings*. IEEE Lecture Notes in Computer Science, vol. 4459, edited by C. Cérin and K.-C. Li, pp. 744–750, Springer-Verlag, Berlin/Heidelberg, doi:10.1007/978-3-540-72360-8\_67. ([PDF](#))

PEER-REVIEWED JOURNAL ARTICLES

- PJ46. \*Capps, S. B., and **C. S. Zender** (2009), The Estimated Global Ocean Wind Power Potential from QuikSCAT Observations, Accounting for Turbine Characteristics and Siting, *In Press in J. Geophys. Res. Atmos.*. ([PDF](#))
- PJ45. †Wang, X., and **C. S. Zender** (2009), MODIS snow albedo bias at high solar zenith angle relative to theory and to *in situ* observations in Greenland, *In Press in Rem. Sens. Environ.*. ([PDF](#))
- PJ44. Krishnamurthy, A., J. K. Moore, N. M. Mahowald, C. Luo, and **C. S. Zender** (2009), The Impacts of Atmospheric Nutrient Inputs on Marine Biogeochemistry, *In Press in J. Geophys. Res. Biogeosci.*. ([PDF](#))
- PJ43. Gallet, J.-C., F. Dominé, **C. S. Zender**, and G. Picard (2009), Measurement of the specific surface area of snow using infrared reflectance in an integrating sphere at 1310 and 1550 nm, *The Cryosphere*, **3**(2), 167–182, <http://www.the-cryosphere.net/3/167/2009>. ([HTML](#), [PDF](#))
- PJ42. Krishnamurthy, A., J. K. Moore, N. M. Mahowald, C. Luo, S. Doney, K. Lindsay, and **C. S. Zender** (2009), Impacts of Increasing Soluble Iron and Nitrogen Deposition on Ocean Biogeochemistry, *Global Biogeochem. Cycles*, **23**, GB3016, doi:10.1029/2008GB003440. ([PDF](#))
- PJ41. \*Flanner, M. G., **C. S. Zender**, P. G. Hess, N. M. Mahowald, T. H. Painter, V. Ramanathan, and P. J. Rasch (2009), Springtime Warming and Reduced Snow Cover from Carbonaceous Particles, *Atmos. Chem. Phys.*, **9**(7), 2481–2497, <http://www.atmos-chem-phys.net/9/2481/2009>. ([HTML](#), [PDF](#))

- PJ40. \*Capps, S. B., and **C. S. Zender** (2009), Global Ocean Wind Power Sensitivity to Surface Layer Stability, *Geophys. Res. Lett.*, **36**, L09801, doi:10.1029/2008GL037063. (PDF)
- PJ39. \*Wang, D. L., **C. S. Zender**, and S. F. Jenks (2009), Efficient Clustered Server-side Data Analysis Workflows using SWAMP, *Earth Sci. Inform.*, **2**(3), 141–155, doi:10.1007/s12145-009-0021-z. (PDF)
- PJ38. \*Capps, S. B., and **C. S. Zender** (2008), Observed and CAM3 GCM Sea Surface Wind Speed Distributions: Characterization, Comparison, and Bias Reduction, *J. Climate*, **21**(24), 6569–6585, doi:10.1175/2008JCLI2374.1. (PDF)
- PJ37. **Zender, C. S.** (2008), Analysis of Self-describing Gridded Geoscience Data with netCDF Operators (NCO), *Environ. Modell. Softw.*, **23**(10), 1338–1342, doi:10.1016/j.envsoft.2008.03.004. (PDF)
- PJ36. \*Han, Q., J. K. Moore, **C. S. Zender**, C. Measures, and D. Hydes (2008), Constraining Oceanic Dust Deposition Using Surface Ocean Dissolved Al, *Global Biogeochem. Cycles*, **22**, GB2003, doi:10.1029/2007GB002975. (PDF)
- PJ35. McConnell, J. R., P. R. Edwards, G. L. Kok, M. G. Flanner, **C. S. Zender**, E. S. Saltzman, J. R. Banta, D. R. Pasteris, M. M. Carter, and J. D. W. Kahl (2007), 20th-Century Industrial Black Carbon Emissions Altered Arctic Climate Forcing, *Science*, **317**(5843), 1381–1384, doi:10.1126/science.1144856. (PDF)
- PJ34. **Zender, C. S.**, and H. J. Mangalam (2007), Scaling Properties of Common Statistical Operators for Gridded Datasets, *Int. J. High Perform. Comput. Appl.*, **21**(4), 485–498, doi:10.1177/1094342007083802. (PDF)
- PJ33. Krishnamurthy, A., J. K. Moore, **C. S. Zender**, and C. Luo (2007), Effects of Atmospheric Inorganic Nitrogen Deposition on Ocean Biogeochemistry. *J. Geophys. Res.*, **112**, G02019, doi:10.1029/2006JG000334. (PDF)
- PJ32. Talamantes, J., S. Behseta, and **C. S. Zender** (2007), Fluctuations in Climate and Incidence of Coccidioidomycosis in Kern County, California: a review, *Ann. N.Y. Acad. Sci.*, **1111**, 73–82, doi:10.1196/annals.1406.028. (PDF)
- PJ31. \*Flanner, M. G., **C. S. Zender**, J. T. Randerson, and P. J. Rasch (2007), Present-Day Climate Forcing and Response from Black Carbon in Snow, *J. Geophys. Res.*, **112**(D11), D11202, doi:10.1029/2006JD008003. (PDF)
- PJ30. †Luo, C., **C. S. Zender**, H. Bian, and S. Metzger (2007), Role of ammonia chemistry and coarse mode aerosols in global climatological inorganic aerosol distributions, *Atmos. Environ.*, **41**(12), 2510–2533, doi:10.1016/j.atmosenv.2006.11.030. (PDF)
- PJ29. Talamantes, J., S. Behseta, and **C. S. Zender** (2007), Statistical Modeling of Valley Fever Data in Kern County, California, *Int. J. Biometeorol.*, **51**(4), 307–313, doi:10.1007/s00484-006-0065-4. (PDF)
- PJ28. Randerson, J. T., H. Liu, M. G. Flanner, S. D. Chambers, Y. Jin, P. G. Hess, G. Pfister, M. C. Mack, K. K. Treseder, L. R. Welp, F. S. Chapin, J. W. Harden, M. L. Goulden, E. Lyons, J. C. Neff, E. A. G. Schuur and **C. S. Zender** (2006), The Impact of Boreal Forest Fire on Climate Warming, *Science*, **314**(5802), 1130–1133, doi:10.1126/science.1132075. (PDF)
- PJ27. Yoshioka, M., N. M. Mahowald, A. J. Conley, W. D. Collins, D. W. Fillmore, **C. S. Zender**, and D. B. Coleman (2007), Impact of Desert Dust Radiative Forcing on Sahel Precipitation: Relative importance of dust compared to sea surface temperature variations, vegetation changes and greenhouse gas warming, *J. Climate*, **20**(8), 1445–1467, doi:10.1175/JCLI4056.1. (PDF)

- PJ26. Washington, R., M. C. Todd, G. Lizcano, I. Tegen, C. Flamant, I. Koren, P. Ginoux, S. Engelstaedter, C. S. Bristow, **C. S. Zender**, A. S. Goudie, A. Warren, J. M. Prospero (2006), Links between topography, wind, deflation, lakes and dust: The case of the Bodélé Depression, Chad, *Geophys. Res. Lett.*, **33**(9), L09401, doi:10.1029/2006GL025827. ([PDF](#))
- PJ25. Mahowald, N. M., D. R. Muhs, S. Levis, P. J. Rasch, M. Yoshioka, **C. S. Zender**, and C. Luo (2006), Change in atmospheric mineral aerosols in response to climate: last glacial period, pre-industrial, modern and doubled carbon dioxide climates, *J. Geophys. Res.* **111**(D10), D10202, doi:10.1029/2005JD006653. ([PDF](#))
- PJ24. \*Flanner, M. G., and **C. S. Zender** (2006), Linking Snowpack Microphysics and Albedo Evolution, *J. Geophys. Res.*, **111**(D12), D12208, doi:10.1029/2005JD006834. ([PDF](#))
- PJ23. Cakmur, R. V., R. L. Miller, J. Perlwitz, D. Koch, I. V. Geogdzhayev, P. Ginoux, I. Tegen, and **C. S. Zender** (2006), Constraining the Magnitude of the Global Dust Cycle by Minimizing the Difference Between a Model and Observations, *J. Geophys. Res.*, **111**(D6), D06207, doi:10.1029/doi:2005JD005791. ([PDF](#))
- PJ22. **Zender, C. S.**, and J. Talamantes (2006), Climate controls on valley fever incidence in Kern County, California, *Int. J. Biometeorol.*, **50**(3), 174–182, doi:10.1007/s00484-005-0007-6. ([PDF](#))
- PJ21. **Zender, C. S.**, and J. Talamantes (2006), Solar Absorption by Mie Resonances in Cloud Droplets, *J. Quant. Spectrosc. Radiat. Transfer*, **98**(1), 122–129, doi:10.1016/j.jqsrt.2005.05.084. ([PDF](#))
- PJ20. **Zender, C. S.**, and E. Y. Kwon (2005), Regional Contrasts in Dust Emission Responses to Climate, *J. Geophys. Res.*, **110**(D13), D13201, doi:10.1029/2004JD005501. ([PDF](#))
- PJ19. \*Flanner, M. G., and **C. S. Zender** (2005), Snowpack Radiative Heating: Influence on Tibetan Plateau Climate, *Geophys. Res. Lett.*, **32**(6), L06501, doi:10.1029/2004GL022076. ([PDF](#))
- PJ18. \*Grini, A., G. Myhre, **C. S. Zender**, and I. S. A. Isaksen (2005), Model simulations of dust sources and transport in the global troposphere, *J. Geophys. Res.*, **110**(D2), D02205, doi:10.1029/2004JD005037. ([PDF](#))
- PJ17. **Zender, C. S.**, R. Miller, and I. Tegen (2004), Quantifying Mineral Dust Mass Budgets: Terminology, Constraints, and Current Estimates, *Eos Trans. AGU*, **85**(48), 509–512, doi:10.1029/2004EO480002. ([PDF](#))
- PJ16. \*Grini, A., and **C. S. Zender** (2004), Roles of saltation, sandblasting, and wind speed variability on mineral dust aerosol size distribution during the Puerto Rican Dust Experiment (PRIDE), *J. Geophys. Res.*, **109**(D7), D07202, doi:10.1029/2003JD004233. ([PDF](#))
- PJ15. Ammann, C. M., G. A. Meehl, W. M. Washington, and **C. S. Zender** (2003), A Monthly and Latitudinally Varying Volcanic Forcing Dataset in Simulations of 20th Century Climate, *Geophys. Res. Lett.*, **30**(12), 1657, doi:10.1029/2003GL016875. ([PDF](#))
- PJ14. Mahowald, N. M., C. Luo, and J. del Corral, and **C. S. Zender** (2003), Interannual variability in Atmospheric Mineral Aerosols from a 22-year Model Simulation and Observational Data, *J. Geophys. Res.*, **108**(D12), 4352, doi:10.1029/2002JD002821. ([PDF](#))
- PJ13. †Bian, H., and **C. S. Zender** (2003), Mineral dust and global tropospheric chemistry: Relative roles of photolysis and heterogeneous uptake, *J. Geophys. Res.*, **108**(D21), 4672, doi:10.1029/2002JD003143. ([PDF](#))
- PJ12. **Zender, C. S.**, D. Newman, and O. Torres (2003), Spatial Heterogeneity in Aeolian Erodibility: Uniform, Topographic, Geomorphic, and Hydrologic Hypotheses, *J. Geophys. Res.*,

- 108(D17), 4543, doi:10.1029/2002JD003039. (PDF)
- PJ11. **Zender, C. S.**, H. Bian, and D. Newman (2003), Mineral Dust Entrainment And Deposition (DEAD) model: Description and 1990s dust climatology, *J. Geophys. Res.*, **108**(D14), 4416, doi:10.1029/2002JD002775. (PDF)
- PJ10. \*Grini, A., **C. S. Zender**, and P. Colarco (2002), Saltation sandblasting behavior during mineral dust aerosol production, *Geophys. Res. Lett.*, **29**(18), 1868, doi:10.1029/2002GL015248. (PDF)
- PJ9. Mahowald, N. M., **C. S. Zender**, C. Luo, D. Savoie, O. Torres, and J. del Corral (2002), Understanding the 30 year Barbados desert dust record, *J. Geophys. Res.*, **107**(D21), 4561, doi:10.1029/2002JD002097. (PDF)
- PJ8. Collins, W. D., P. J. Rasch, B. E. Eaton, D. W. Fillmore, J. T. Kiehl, C. T. Beck, and **C. S. Zender** (2002), Simulation of Aerosol Distributions and Radiative Forcing for INDOEX: Regional Climate Impacts, *J. Geophys. Res.*, **107**(D19), 8028, doi:10.1029/2000JD000032. (PDF)
- PJ7. Yu, S., **C. S. Zender**, and V. K. Saxena (2001), Direct radiative forcing and atmospheric absorption by boundary layer aerosol in the southeastern US: model estimates on the basis of new observations, *Atmos. Env.*, **35**(23), 3967–3977, doi:10.1016/S1352-2310(01)00187-X. (PDF)
- PJ6. Collins, W. D., P. J. Rasch, B. E. Eaton, B. Khattatov, J.-F. Lamarque, and **C. S. Zender** (2001), Forecasting aerosols using a chemical transport model with assimilation of satellite aerosol retrievals: Methodology for INDOEX, *J. Geophys. Res.*, **106**(D7), 7313–7336. (PDF)
- PJ5. **Zender, C. S.** (1999), Global climatology of abundance and solar absorption of oxygen collision complexes, *J. Geophys. Res.*, **104**(D20), 24471–24484. (PDF)
- PJ4. Cess, R. D., M. Zhang, F. P. J. Valero, S. K. Pope, A. Bucholtz, B. Bush, **C. S. Zender**, and J. Vitko Jr. (1999), Absorption of solar radiation by the cloudy atmosphere: Further interpretations of collocated aircraft measurements, *J. Geophys. Res.*, **104**(D2), 2059–2066. (PDF)
- PJ3. **Zender, C. S.**, B. Bush, S. K. Pope, A. Bucholtz, W. D. Collins, J. T. Kiehl, F. P. J. Valero, and J. Vitko Jr. (1997), Atmospheric absorption during the Atmospheric Radiation Measurement (ARM) Enhanced Shortwave Experiment (ARESE), *J. Geophys. Res.*, **102**(D25), 29901–29915. (PDF)
- PJ2. **Zender, C. S.**, and J. T. Kiehl (1997), Sensitivity of climate simulations to radiative effects of tropical anvil structure, *J. Geophys. Res.*, **102**(D20), 23793–23803. (PDF)
- PJ1. **Zender, C. S.**, and J. T. Kiehl (1994), Radiative sensitivities of tropical anvils to small ice crystals, *J. Geophys. Res.*, **99**(D12), 25869–25880, doi:10.1029/94JD02090. (PDF)

## CONFERENCE REPORTS

- CR1. M. Dubey, **C. S. Zender**, C. Folland, and P. Chýlek (2008), Global Warming and the Next Ice Age, *Bull. Am. Meteorol. Soc.*, **89**(12), 1905–1909, doi:10.1175/2008BAMS2359.1. (PDF)

## EXTENDED ABSTRACTS

- EA7. Zender, C. S., F. Dominé, J.-C. Gallet, and G. Picard (2009): Darkening of Soot-doped Natural Snow: Measurements and Model, *Proceedings of the International Workshop on Black*

*Carbon in Snow Sampling, Albedo Effects and Climate Impact*, Norwegian Polar Institute, Tromsø, Norway, August 13–14, 2009. ([PDF](#))

- EA6. Wang, D. L., C. S. Zender, and S. F. Jenks (2007), DAP-enabled Server-side Data Reduction and Analysis, *Proceedings of the 23rd AMS Conference on Interactive Information and Processing Systems (IIPS) for Meteorology, Oceanography, and Hydrology*, Paper 3B.2, January 14–18, San Antonio, TX. American Meteorological Society Annual Meeting, AMS Press, Boston, MA. ([PDF](#))
- EA5. Zender, C. S., J. Talamantes, and S. Behseta (2007), Does Climate Control Valley Fever Incidence in California?, *Proceedings of the 16th AMS Conference on Applied Climatology*, Paper 2.2, January 14–18, San Antonio, TX. American Meteorological Society Annual Meeting, AMS Press, Boston, MA. ([PDF](#))
- EA4. Zender, C. S., and D. L. Wang (2007), High performance distributed data reduction and analysis with the netCDF Operators (NCO), *Proceedings of the 23rd AMS Conference on Interactive Information and Processing Systems (IIPS) for Meteorology, Oceanography, and Hydrology*, Paper 3B.4, January 14–18, San Antonio, TX. American Meteorological Society Annual Meeting, AMS Press, Boston, MA. ([PDF](#))
- EA3. Zender, C. S. and D. J. Newman (2002), Simulated Global Atmospheric Dust Distribution: Sensitivity to Regional Topography, Geomorphology, and Hydrology. *Proceedings of the Fifth International Conference on Aeolian Research (ICAR5) and Global Change & Terrestrial Ecosystem-Soil Erosion Network (GCTE-SEN) joint meeting*, Lubbock, TX, July 22–25. ([PDF](#))
- EA2. Zender, C. S. (1999), Radiative Forcing by Mineral Dust, *Proceedings of the First International Workshop on Mineral Dust*, Boulder, CO, June 9–11. ([PDF](#))
- EA1. Zender, C. S. and P. Chýlek (1998), A Global Climatology of O<sub>2</sub>·O<sub>2</sub>, O<sub>2</sub>·N<sub>2</sub>, and H<sub>2</sub>O·H<sub>2</sub>O Abundance and Absorption, *Proceedings of the Eighth Atmospheric Radiation Measurement (ARM) Science Team Meeting*, Tucson, AZ, March 23–27. ([PDF](#))

## NEWSPAPERS, MAGAZINES, TRADE JOURNALS

- N3. Zender, C. S. (2004), There's Got to Be a Morning After "The Day After Tomorrow", *OC Weekly*, 9(39), p. 24, June 4–10. ([HTML](#)) ([PDF](#))
- N2. Zender, C. S. (2004), "UC Irvine Extends Climate Research with IBM Supercomputer", *Syllabus/Campus Technology*, July–August, pp. 4–5. ([HTML](#)) ([PDF](#))
- N1. Zender, C. S. (2004), "Extending Climate Research at ESMF", *Scientific Computing & Instrumentation*, September. ([HTML](#)) ([PDF](#))

## INVITED PRESENTATIONS AT EDUCATIONAL, GOVERNMENTAL INSTITUTIONS

IE22. *Past:*

Zender, C. S., S. Capps, and A. Grini (2008): Climate Sensitivity to Sub-gridscale Horizontal Winds. Presented to the Climate and Global Dynamics (CGD) Division of the National Center for Atmospheric Research (NCAR), Boulder, CO, October 13, 2008. ([PDF](#))

- IE21. Zender, C. S. and M. G. Flanner (2007): Present, Past, and Future Climate Effects and Efficacy of Dirty Snow. Presented to the Climate and Global Dynamics (CGD) Division of the National Center for Atmospheric Research (NCAR), Boulder, CO, November 29, 2007. ([PDF](#))

- IE20. Zender, C. S. (2007): Snowpack Radiative Transfer. Presented to the Laboratoire de Glaciologie et Géophysique de l'Environnement (LGGE), Grenoble, France, October 23, 2007.
- IE19. Zender, C. S. (2007): Arctic Climate Effects of Black Carbon. Presented to the Oversight and Government Reform Committee, United States House of Representatives, Washington, DC, October 18, 2007. ([Video](#), [Oral](#), [Written](#))
- IE18. Zender, C. S., and M. G. Flanner (2007): Present, Past, and Future Climate Effects and Efficacy of Dirty Snow. Presented to the Laboratoire de Glaciologie et Géophysique de l'Environnement (LGGE), Grenoble, France, September 6, 2007. ([PDF](#))
- IE17. Zender, C. S., M. G. Flanner, J. T. Randerson, N. Mahowald, P. J. Rasch, M. Yoshioka, T. H. Painter (2006): Present and Last Glacial Climate Effects of Dust and Soot in Snow. Presented to the Climate and Global Dynamics (CGD) Division of the National Center for Atmospheric Research (NCAR), Boulder, CO, October 3, 2006. ([PDF](#))
- IE16. Zender, C. S. (2005): Distributed Data Reduction and Analysis: An Overview with Applications to Californian Climate and Energy Demand. Presented to the UCI Calit2 SURF-IT program, University of California, Irvine, Irvine, CA, August 23, 2005. ([PDF](#))
- IE15. Zender, C. S. (2005): Regional Contrasts in Soil Dust Emission Responses to Climate. Presented to the Department of Crop and Soil Sciences, Washington State University, Pullman, WA, February 2, 2005. ([PDF](#))
- IE14. Zender, C. S. and M. G. Flanner (2005): Snowpack Radiative Heating: Influence on Tibetan Plateau Climate. Presented to the Climate and Global Dynamics Division, National Center for Atmospheric Research, Boulder, CO, January 20, 2005. ([PDF](#))
- IE13. Zender, C. S. (2004): The Influence of Wind Erosion in Past, Present, and Future Climates, Presented to the Institut de Ciència i Tecnologia Ambientals Seminar, Universitat Autònoma de Barcelona, Spain, March 30, 2004.
- IE12. Zender, C. S. (2004): Global Patterns of Wind Erosion and Dust Emission in the Present Climate. Presented to the Department of Chemical Engineering, Universitat Polytechnica de Catalunya, Spain, March 26, 2004.
- IE11. Zender, C. S., D. J. Newman, and O. Torres (2003): Spatial Heterogeneity in Aeolian Erodibility: Uniform, Topographic, Geomorphic, and Hydrologic Hypotheses. Presented to the Department of Geophysics, University of Oslo, Norway, January 16, 2003.
- IE10. Zender, C. S. (2001): Understanding the Global Distribution and Radiative Forcing of Mineral Dust Aerosol. Presented to the Department of Earth Sciences, University of Southern California, Los Angeles, CA, December 3, 2001.
- IE9. Zender, C. S. (2001): Understanding the Global Distribution and Radiative Forcing of Mineral Dust Aerosol. Presented to the Department of Environmental Science and Engineering, California Institute of Technology, Pasadena, CA, November 15, 2001.
- IE8. Zender, C. S. (2001): Re-examining radiative forcing by clouds, aerosols, and gases. Presented to the Department of Atmospheric Science, University of California, Los Angeles, CA, April 25, 2001.
- IE7. Zender, C. S. (2001): Aeolian Mineral Dust in the Climate System: Observations, Models, and Implications. Presented to the Department of Earth Sciences, University of California, Santa Cruz, CA, February 21, 2001.
- IE6. Zender, C. S. (2001): Re-examining radiative forcing by clouds, aerosols, and gases. Presented to the Department of Earth Sciences, University of California, Santa Cruz, CA, February 20, 2001.

- IE5. Zender, C. S. (2001): Modeling the Global Distribution of Mineral Dust. Presented to the Bren School of Environmental Science and Management, University of California, Santa Barbara, CA, January 19, 2001.
- IE4. Zender, C. S. (2000): Modeling the Global Distribution of Mineral Dust. Presented to the Department of Earth System Science, University of California, Irvine, CA, December 1, 2000.
- IE3. Zender, C. S. (1998): Discrepancies in the Solar Radiative Energy Budget: The roles of Mineral Dust and Collision-Induced Absorption. Presented to the Department of Earth System Science, University of California, Irvine, CA, November 16, 1998.
- IE2. Zender, C. S. (1998): Enhanced Cloud Absorption: An Overview and Recent Results. Presented to the Department of Meteorology at Florida State University, Tallahassee, FL, April 9, 1998.
- IE1. Zender, C. S. (1998): Mineral Dust in the Troposphere: Observations and Implications. Presented to the Department of Environmental Sciences at the University of Virginia, Charlottesville, VA, February 27, 1998.

#### **INVITED PRESENTATIONS AT PROFESSIONAL MEETINGS & WORKSHOPS**

##### *IM17. Upcoming and subject to change:*

Zender, C. S. (2009): Ancient Secrets of Open-Source Geoscience Software Management. Presented to the American Geophysical Union Fall Meeting, San Francisco, CA, December 14–18, 2009. *Eos Trans. AGU*, **90**(53), Fall Meet. Suppl., Abstract IN11D-1068. ([PDF](#))

##### *IM16. Past:*

Zender, C. S. (2009): Offshore Wind Power and Geoengineering: Why, Where, and How. Presented to the Taiwan-America Science and Technology Conference (TASTC) on Energy and Nanotechnology, Costa Mesa, CA, October 3, 2009. ([PDF](#))

IM15. Zender, C. S. (2009): Windblown Desert Dust: A Climate Wildcard. Presented to the Chinese Academy of Sciences (CAS) - Third World Academy of Sciences (TWAS) - World Meteorological Organization (WMO) Forum (CTWF) International Workshop on Mineral Aerosol and Impacts on Climate and Environment, Lanzhou University, Lanzhou, China, August 17–19, 2009. ([PDF](#))

IM14. Zender, C. S., F. Dominé, J.-C. Gallet, and G. Picard (2009): Darkening of Soot-doped Natural Snow: Measurements and Model. Presented to the International Workshop on Black Carbon in Snow Sampling, Albedo Effects and Climate Impact, Norwegian Polar Institute, Tromsø, Norway, August 13–14, 2009. ([PDF](#))

IM13. Zender, C. S. (2009): Windblown Desert Dust: A Climate Wildcard. Presented to the Fifteenth Annual German-American Kavli Frontiers of Science Symposium, U.S. National Academy of Sciences, Irvine, CA, June 5–7, 2009. ([Video](#), [PDF](#))

IM12. Zender, C. S., M. G. Flanner, F. Dominé, and J. McConnell (2009): Dust and Soot Aerosol Effects on Snow and Climate. Presented to the 21st Session of the Global Energy and Water Cycle Experiment (GEWEX) Scientific Steering Group (SSG) Meeting, Irvine, California, January 19–23, 2009. ([PDF](#))

IM11. Zender, C. S., M. G. Flanner, F. Dominé, and J. McConnell (2008): After the Fall: Consequences of combustion and dust aerosols in snow. Presented to the Tenth International Global Atmospheric Chemistry (IGAC) Conference, Annecy, France, September 7–12, 2008. (*Keynote*) ([Video](#), [PDF](#))

- IM10. Zender, C. S., and M. G. Flanner (2008): Dust-snow/ice interactions: a climate modulator on glacial timescales? Presented to the European Geophysical Union (EGU) Spring Meeting, Vienna, Austria, April 13–18, 2008. ([PDF](#))
- IM9. Zender, C. S., and M. G. Flanner (2007): Snowpack-Mediated Aerosol-Climate Interactions. Presented to the Radiation and Climate Gordon Research Conference, Colby Sawyer College, New London, NH, July 30–August 3, 2007. ([PDF](#))
- IM8. Zender, C. S., M. G. Flanner, J. T. Randerson, N. Mahowald, P. J. Rasch, M. Yoshioka, T. H. Painter (2007): Dust-Snow/Ice Interactions: A Glacial Cycle Modulator or Trigger? Presented to the International Association of Meteorology and Atmospheric Sciences (IAMAS) Scientific Assembly, Symposium on the Mineral Dust Cycle and its Impact on Clouds and Radiation, Perugia, Italy, July 2–13, 2007. ([PDF](#))
- IM7. Zender, C. S., M. G. Flanner, J. T. Randerson, N. Mahowald, P. J. Rasch, M. Yoshioka, T. H. Painter (2006): Snowpack-Mediated Aerosol-Climate Interactions. Presented to the Global Warming and the Next Ice Age Conference, Santa Fe, NM, July 17–19, 2006. ([PDF](#))
- IM6. Zender, C. S. and E. Y. Kwon (2005): Regional Contrasts in Soil Dust Emission Responses to Climate, Presented to the International Association of Meteorology and Atmospheric Sciences (IAMAS) Scientific Assembly, Beijing, China, August 2–11, 2005. ([PDF](#))
- IM5. Zender, C. S. (2005): What is a Model? Presented to the Buckminster Fuller Institute Space-ship Earth Design Workshop, California Institute for Telecommunications and Information Technology, University of California, Irvine, Irvine, CA, May 12, 2005. ([PDF](#))
- IM4. Zender, C. S. (2004): Opportunities for Dust & Loess Observations to Improve Models. Presented to the Mineral Dust Workshop, University of Colorado at Boulder, Boulder, CO, October 22–23, 2004. ([PDF](#))
- IM3. Zender, C. S. and R. L. Miller (2004): Natural and Anthropogenic Mineral Dust: Systematic Terminology and Current Mass Budget Estimates. Presented to Joint American Geophysical Union and Canadian Geophysical Union Spring Meeting, Montreal, Canada, May 17–21, 2004. ([PDF](#))
- IM2. Zender, C. S., J. Famiglietti, F. Kuester, R. Pajarola, and F. Wessel (2004): Earth System Modeling Facility: Linking Climate to Cal-(IT)<sup>2</sup> and OptIPuter. Presented to the Third Cal-(IT)<sup>2</sup> All-hands Meeting, University of California at San Diego, La Jolla, CA, April 12, 2004. ([PDF](#))
- IM1. Zender, C. S. and H. Bian (2004): Mineral dust aerosol and tropospheric ozone: Sensitivity to season, species, uptake rate, and chemical composition. Presented to the European Geophysical Society (EGS) Spring Meeting, Nice, France, April 26–30, 2004.

**CONTRIBUTED PRESENTATIONS AT PROFESSIONAL MEETINGS & WORKSHOPS**  
(Presented by C. Zender unless noted)

CM93. *Upcoming and subject to change:*

- Allen, R. J. and **C. S. Zender** (2009): Investigating the effects of Eurasian snow cover on winter climate. Presented by R. J. Allen to the American Geophysical Union Fall Meeting, San Francisco, CA, December 14–18, 2009. *Eos Trans. AGU*, **90**(53), Fall Meet. Suppl., Abstract A31A-0079. ([PDF](#))
- CM92. Wang, X. and **C. S. Zender** (2009): MODIS snow albedo bias at high solar zenith angles relative to theory and to *in situ* observations in Greenland. Presented by X. Wang to the

- American Geophysical Union Fall Meeting, San Francisco, CA, December 14–18, 2009. *Eos Trans. AGU*, **90**(53), Fall Meet. Suppl., Abstract C31C-0450. ([PDF](#))
- CM91. Tosca, M. G., **C. S. Zender**, J. T. Randerson, D. L. Nelson, D. J. Diner (2009): Characterization of Indonesian smoke plumes during El Niño and La Niña. Presented by M. Tosca to the American Geophysical Union Fall Meeting, San Francisco, CA, December 14–18, 2009. *Eos Trans. AGU*, **90**(53), Fall Meet. Suppl., Abstract A43C-0252. ([PDF](#))
- CM90. *Past*:  
 Han, Q., and **C. S. Zender** (2009): Aerosol Tracer Age: The Explicit Lifetime Tracking Method Applied to Dust. Presented by Q. Han to the 14th Annual CCSM Workshop, Breckenridge, CO, June 15–18, 2009. ([PDF](#))
- CM89. Capps, S. B. and **C. S. Zender** (2009), Global Ocean Wind Power Sensitivity to Turbine Characteristics and Siting. Presented by S. Capps to the Renewable Energy Center of the Desert Research Institute, Reno, NV, June 10, 2009. ([PDF](#))
- CM88. Capps, S. B. and **C. S. Zender** (2009), Surface Wind Speed Distributions: Implications for Climate and Wind Power. Presented by S. Capps to the Climate, Oceans, and Solid Earth Science Section of the Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA, January 28, 2009. ([PDF](#))
- CM87. **Zender, C. S.**, J.-C. Gallet, F. Dominé, and M. Flanner (2008): Albedo reduction by dirty snow: measurements and implications. Presented to the American Geophysical Union Fall Meeting, San Francisco, CA, December 15–19, 2008. *Eos Trans. AGU*, **89**(53), Fall Meet. Suppl., Abstract C41C-0535. ([PDF](#))
- CM86. Capps, S. B. and **C. S. Zender** (2008): Assessing offshore 80 m height wind power using QuikSCAT 10 m winds. Presented by S. Capps to the American Geophysical Union Fall Meeting, San Francisco, CA, December 15–19, 2008. *Eos Trans. AGU*, **89**(53), Fall Meet. Suppl., Abstract A21E-0248. ([PDF](#))
- CM85. Tosca, M. G., J. T. Randerson, **C. S. Zender**, D. Nelson, D. Diner, and M. G. Flanner (2008): Tropical fire emissions injection heights and their impact on climate. Presented by M. Tosca to the American Geophysical Union Fall Meeting, San Francisco, CA, December 15–19, 2008. *Eos Trans. AGU*, **89**(53), Fall Meet. Suppl., Abstract B31E-0345. ([PDF](#))
- CM84. Han, Q., **C. S. Zender**, and J. K. Moore (2008): Estimation of Fe and Al aerosol solubility from a diffusive method based on particle size. Presented by Q. Han to the American Geophysical Union Fall Meeting, San Francisco, CA, December 15–19, 2008. *Eos Trans. AGU*, **89**(53), Fall Meet. Suppl., Abstract OS23E-1295. ([PDF](#))
- CM83. Tosca, M. G., J. T. Randerson, **C. S. Zender**, D. Nelson, D. Diner, and M. G. Flanner (2008): Tropical fire emissions injection heights and their impact on climate. Presented by M. Tosca to the MISR Data Users Science Symposium, Jet Propulsion Laboratory, Pasadena, CA, December 11–12, 2008. ([PDF](#))
- CM82. Tosca, M. G., J. T. Randerson, **C. S. Zender**, D. Nelson, D. Diner, and M. G. Flanner (2008): Do biomass burning aerosols intensify drought in equatorial Asia during El Niño? Presented by M. Tosca to the Marie Curie Action and IGBP iLEAPS (Integrated Land Ecosystem-Atmosphere Processes Study) Feedbacks and Land-Climate Dynamics Conference, Hyeres, France, November 16–20, 2008. ([PDF](#))
- CM81. J.-C. Gallet, F. Dominé, **C. S. Zender**, and G. Picard (2008): Determining the specific surface area of snow by IR reflectance by using an integrating sphere and two wavelengths. Presented by J.-C. Gallet to the Tenth International Global Atmospheric Chemistry (IGAC)

- Conference, Annecy, France, September 7–12, 2008. ([PDF](#))
- CM80. Flanner, M. G. and **C. S. Zender** (2008): Snow-albedo feedback triggered by carbonaceous particles. Presented by M. Flanner to the 9th International Conference on Carbonaceous Particles in the Atmosphere (ICCPA), Lawrence Berkeley National Laboratory (LBNL), Berkeley, CA, August 12–14, 2008.
- CM79. Capps, S. B. and **C. S. Zender** (2008), Sub-Gridscale Wind Speed Variability and Climate. Presented by S. Capps to the PIMS Summer School on Stochastic and Probabilistic Methods for Atmosphere, Ocean, and Climate Dynamics, University of Victoria, BC, Canada, July 14–18, 2008. ([PDF](#))
- CM78. Flanner, M. G. and **C. S. Zender** (2008): The influence of snow darkening on recent snow cover trends. Presented by M. Flanner to the Physical Sciences Division (PSD) of the Earth System Research Laboratory (ESRL), National Oceanic and Atmospheric Administration (NOAA), Boulder CO, May 21, 2008.
- CM77. Capps, S. B. and **C. S. Zender** (2008), Using QuikSCAT Surface Wind Measurements to Understand Wind Speed Variability and Surface Flux Implications. Presented by S. Capps to the American Society of Limnology and Oceanography 2008 Ocean Sciences Meeting, Orlando, FL, March 2-7, 2008. ([PDF](#))
- CM76. Capps, S. B. and **C. S. Zender** (2008), Sub-Gridscale Wind Speed Variability and Climate. Presented by S. Capps to the Les Houches Summer School Session on Atmospheric Boundary Layers: Concepts, Observations, and Numerical Simulations, École de Physique, Les Houches, France, June 17–27, 2008. ([PDF](#))
- CM75. Wang, D. L., **C. S. Zender**, and S. F. Jenks (2008), Cluster Workflow Execution of Retargeted Data Analysis Scripts. Presented by D. Wang to the 8th IEEE International Symposium on Cluster Computing and the Grid (CCGRID '08), Lyon, France, 19–22 May, 2008. ([PDF](#))
- CM74. **Zender, C. S.**, J.-C. Gallet, F. Dominé, and M. Flanner (2008): Albedo reduction by soot-contaminated snow: measurements and implications. Presented to the European Geophysical Union (EGU) Spring Meeting, Vienna, Austria, April 13–18, 2008. ([PDF](#))
- CM73. J.-C. Gallet, F. Dominé, and **C. S. Zender** (2008): The accurate determination of the specific surface area of snow by IR reflectance. Presented by F. Dominé to the European Geophysical Union (EGU) Spring Meeting, Vienna, Austria, April 13–18, 2008. ([PDF](#))
- CM72. F. Dominé, M. Bisiaux, J.-C. Gallet, and **C. S. Zender** (2008): Impact of the heat conductivity of snow on permafrost extent. Presented by F. Dominé to the European Geophysical Union (EGU) Spring Meeting, Vienna, Austria, April 13–18, 2008. ([PDF](#))
- CM71. J.-C. Gallet, F. Dominé, and **C. S. Zender** (2008), Optical Measurement of Snow Specific Surface Area (Mesure de la Surface Spécifique de la Neige par Méthode Optique), Presented by J.-C. Gallet to the 12th Alpine Glaciological Meeting Chamonix, France, March 6–7, 2008. ([PDF](#))
- CM70. Wang, D. L., **C. S. Zender**, and S. F. Jenks (2007), A System for Scripted Data Analysis at Remote Data Centers. Presented by D. Wang to the American Geophysical Union Fall Meeting, San Francisco, CA, December 10–14, 2007. *Eos Trans. AGU*, **88**(52), Fall Meet. Suppl., Abstract IN11B-0469. ([PDF](#))
- CM69. Tosca, M. G, M. G. Flanner, P. J. Rasch, J. T. Randerson, and **C. S. Zender** (2007), Biomass Burning Aerosols Reduce Precipitation in equatorial SouthEast Asia during El Niño, Presented by M. Tosca to the American Geophysical Union Fall Meeting, San Francisco, CA, December 10–14, 2007. *Eos Trans. AGU*, **88**(52), Fall Meet. Suppl., Abstract A33E-1640.

- (PDF)
- CM68. Flanner, M. G., **C. S. Zender**, J. T. Randerson, and N. M. Mahowald (2007): Investigating smoke's influence on primary production throughout the Amazon, Presented by M. Flanner to the American Geophysical Union Fall Meeting, San Francisco, CA, December 10–14, 2007. *Eos Trans. AGU*, **88**(52), Fall Meet. Suppl., Abstract A33E-1648. (PDF)
- CM67. Tosca, M. G., M. G. Flanner, P. J. Rasch, J. T. Randerson, and **C. S. Zender** (2007), Biomass Burning Aerosol Optical Depth is Under-predicted by CCSM, Presented by M. Tosca to the MISR Data Users Science Symposium, Jet Propulsion Laboratory, Pasadena, CA, December 6–7, 2007. (PDF)
- CM66. McConnell, J. R., R. Edwards, G. L. Kok, M. G. Flanner, **C. S. Zender**, E. Saltzman, J. R. Banta, D. R. Pasteris, M. M. Carter, and J. D. Kahl, Concentrations and Sources of Soot in Greenland Precipitation from 1788 to 2002: Implications for Radiative Forcing, Presented by J. McConnell to the American Geophysical Union Fall Meeting, San Francisco, CA, December 10–14, 2007. *Eos Trans. AGU*, **88**(52), Fall Meet. Suppl., Abstract A44B-01.
- CM65. Flanner, M. G. and **C. S. Zender** (2007), Black Carbon in Snow: Role in Arctic Climate, Uncertainties, and Future Scenarios. Presented by M. Flanner to the Short-lived Pollutants and Arctic Climate (SPAC) workshop hosted by the Norwegian Institute for Air Research (NILU), Oslo, Norway, November 8–9, 2007. (PDF)
- CM64. Capps, S. B. and **C. S. Zender** (2007), Using QuikSCAT-derived surface winds and a GCM to improve predicted wind speed variability and ocean surface fluxes. Presented by S. Capps to the 15th American Meteorological Society (AMS) Conference on Air-Sea Interaction, Portland, OR, August 20–23, 2007. (PDF)
- CM63. **Zender, C. S.**, M. G. Flanner, J. T. Randerson, N. Mahowald, P. J. Rasch, M. Yoshioka, T. H. Painter, J. R. McConnell, and P. R. Edwards (2007): Present, Past, and Future Climate Effects and Efficacy of Dirty Snow. Presented to the International Association of Meteorology and Atmospheric Sciences (IAMAS) Scientific Assembly, Symposium on Earth System Interactions, Perugia, Italy, July 2–13, 2007. (PDF)
- CM62. Wang, D. L., **C. S. Zender**, and S. F. Jenks (2007), Server-side Parallel Data Reduction and Analysis. Presented by D. Wang to the Second International Conference on Grid and Pervasive Computing (GPC), Paris, France, May 2–4, 2007. (PDF)
- CM61. Flanner, M. G. and **C. S. Zender** (2007), Snow Aging, Black Carbon, and Implications for Climate Change. Presented by M. Flanner to the Department of Civil and Environmental Engineering, University of California, Los Angeles, Los Angeles, California, March 6, 2007.
- CM60. Flanner, M. G. and **C. S. Zender** (2007), Snow Solar Radiative Treatment in the Community Land Model (CLM). Presented by M. Flanner to the Land Model Working Group meeting at the National Center for Atmospheric Research, Boulder, CO, February 27–28, 2007.
- CM59. Wang, D. L., **C. S. Zender**, and S. F. Jenks (2007), Server-side Data Reduction and Analysis with Script Workflow Analysis for Multi-Processing. Presented by D. Wang to the OPeNDAP Developer's Workshop, Boulder, CO, February 21–23, 2007. (PDF)
- CM58. Capps, S. B. and **C. S. Zender** (2007), Comparing CAM3 Surface Winds With Observed 10-m Surface Winds (SeaWinds). Presented by S. Capps to the Atmospheric Model Working Group meeting at the National Center for Atmospheric Research, Boulder, CO, January 29–31, 2007. (PDF)
- CM57. Wang, D. L., **C. S. Zender**, and S. F. Jenks (2007), Server-side Data Reduction and Anal-

- ysis with Script Workflow Analysis for Multi-Processing. Presented by D. Wang to the 23rd AMS Conference on Interactive Information and Processing Systems (IIPS) for Meteorology, Oceanography, and Hydrology, San Antonio, TX, January 14–18, 2007. ([PDF](#))
- CM56. **Zender, C. S.**, and D. L. Wang (2007): High performance distributed data reduction and analysis with the netCDF Operators (NCO). Presented to the 23rd AMS Conference on Interactive Information and Processing Systems (IIPS) for Meteorology, Oceanography, and Hydrology, San Antonio, TX, January 14–18, 2007. ([PDF](#))
- CM55. **Zender, C. S.**, J. Talamantes, and S. Behseta (2007): Does Climate Control Valley Fever Incidence in California? Presented to the 16th AMS Conference on Applied Climatology, San Antonio, TX, January 14–18, 2007. ([PDF](#))
- CM54. Flanner, M. G. and **C. S. Zender** (2007), Modeling Climate Effects of Black Carbon in Snow. Presented by M. Flanner to the Clean Air Task Force (CATF) Arctic Climate Impacts workshop at the NASA Goddard Institute for Space Studies, New York, NY, January 8–9, 2007.
- CM53. Han, Q., J. K. Moore, **C. S. Zender**, and C. I. Measures (2006): Constraining Oceanic Dust Deposition Using Surface Ocean Dissolved Al. Presented by Q. Han to the American Geophysical Union Fall Meeting, San Francisco, CA, December 5–9, 2006. *Eos Trans. AGU*, **87**(52), Fall Meet. Suppl., Abstract OS32B-06. ([PDF](#))
- CM52. Flanner, M. G., **C. S. Zender**, J. T. Randerson, P. J. Rasch, and P. S. Kasibhatla (2006): Present Day Climate Forcing and Response from Black Carbon in Snow. Presented by M. Flanner to the American Geophysical Union Fall Meeting, San Francisco, CA, December 11–15, 2006. *Eos Trans. AGU*, **87**(52), Fall Meet. Suppl., Abstract A34C-02. ([PDF](#))
- CM51. **Zender, C. S.**, M. G. Flanner, J. T. Randerson, N. Mahowald, P. J. Rasch, M. Yoshioka, T. H. Painter (2006): Climate Effects and Efficacy of Dust and Soot in Snow. Presented to the American Geophysical Union Fall Meeting, San Francisco, CA, December 5–9, 2006. *Eos Trans. AGU*, **87**(52), Fall Meet. Suppl., Abstract A32C-07. ([PDF](#))
- CM50. **Zender, C. S.**, H. Mangalam, and D. Wang (2006): Improving Scaling Properties of Common Statistical Operators for Gridded Geoscience Datasets. Presented to the American Geophysical Union Fall Meeting, San Francisco, CA, December 5–9, 2006. *Eos Trans. AGU*, **87**(52), Fall Meet. Suppl., Abstract IN53B-0827. ([PDF](#))
- CM49. D. Wang, **C. S. Zender**, and S. F. Jenks (2006): Server-side netCDF Data Reduction and Analysis. Presented by D. Wang to the American Geophysical Union Fall Meeting, San Francisco, CA, December 5–9, 2006. *Eos Trans. AGU*, **87**(52), Fall Meet. Suppl., Abstract IN53B-0826. ([PDF](#))
- CM48. Talamantes, J., S. Behseta, and **C. S. Zender** (2006): Statistical Modeling Of Valley Fever Data in Kern County, California. Presented by J. Talamantes to the Sixth International Symposium on Coccidioidomycosis, Stanford University, Stanford, CA, August 23–27, 2006. ([PDF](#))
- CM47. Flanner, M., **C. S. Zender**, J. T. Randerson, and P. J. Rasch (2006): Present Day Climate Forcing and Response from Black Carbon in Snow. Presented by M. Flanner to the 11th Annual CCSM Workshop, Breckenridge, CO, June 20–22, 2006. ([PDF](#))
- CM46. Krishnamurthy, A., J. K. Moore, C. Luo, and **C. S. Zender** (2006): The Effects of Atmospheric Inorganic Nitrogen Deposition on Ocean Biogeochemistry. Presented by A. Krishnamurthy to the 11th Annual CCSM Workshop, Breckenridge, CO, June 20–22, 2006. ([PDF](#))

- CM45. Randerson, J. T., H. Liu, M. G. Flanner, S. D. Chambers, J. W. Harden, P. G. Hess, Y. Jin, M. C. Mack, G. Pfister, E. A. Schuur, K. K. Treseder, L. R. Welp, and **C. S. Zender** (2005): Boreal Forest Fire Cools Climate. Presented by J. Randerson to the American Geophysical Union Fall Meeting, San Francisco, CA, December 5–9, 2005. *Eos Trans. AGU*, **86**(52), Fall Meet. Suppl., Abstract B42B-03.
- CM44. Knox, C. J., M. Brown, K. Doerr, S. Jenks, **C. S. Zender**, and F. Kuester (2005): Simultaneous Visualization of the IPCC AR4 Model Ensemble on an Extremely High Resolution Display Wall (HIPerWall). Presented by C. Knox to the American Geophysical Union Fall Meeting, San Francisco, CA, December 5–9, 2005. *Eos Trans. AGU*, **86**(52), Fall Meet. Suppl., Abstract IN31A-1140.
- CM43. Yoshioka, M., N. Mahowald, A. Conley, D. W. Fillmore, W. D. Collins, **C. S. Zender** (2005): Impact of Desert Dust Radiative Forcing on Sahel Precipitation. Presented by M. Yoshioka to the American Geophysical Union Fall Meeting, San Francisco, CA, December 5–9, 2005. *Eos Trans. AGU*, **86**(52), Fall Meet. Suppl., Abstract P13B-0157.
- CM42. Mahowald, N., D. Muhs, S. Levis, M. Yoshioka, P. J. Rasch, **C. S. Zender**, G. Okin, and T. H. Painter (2005): Deposition Changes in the Past And The Future. Presented by N. Mahowald to the American Geophysical Union Fall Meeting, San Francisco, CA, December 5–9, 2005. *Eos Trans. AGU*, **86**(52), Fall Meet. Suppl., Abstract B34B-03.
- CM41. Flanner, M. G., and **C. S. Zender** (2005): Snowpack Radiative Heating: Influence on Tibetan Plateau Climate. Presented by M. Flanner to the American Geophysical Union Fall Meeting, San Francisco, CA, December 5–9, 2005. *Eos Trans. AGU*, **86**(52), Fall Meet. Suppl., Abstract C12A-07. ([PDF](#))
- CM40. Flanner, M. G., **C. S. Zender**, J. T. Randerson, Y. Jin, and P. J. Rasch (2005): Dirty Snow, Atmospheric Warming, and Climate Feedbacks from Boreal Carbon Aerosol Emissions. Presented by M. Flanner to the American Geophysical Union Fall Meeting, San Francisco, CA, December 5–9, 2005. *Eos Trans. AGU*, **86**(52), Fall Meet. Suppl., Abstract A31C-05. ([PDF](#))
- CM39. Brown, M. and **C. S. Zender** (2005): Distributed Data Reduction Techniques Applied to California Climate Change. Presented by M. Brown to the Summer Undergraduate Research Fellows in Information Technology (SURF-IT) program, California Institute for Telecommunications and Information Technology, University of California, Irvine, Irvine, CA, September 2, 2005. ([PDF](#))
- CM38. Flanner, M. G. and **C. S. Zender** (2004): Climate Sensitivity to Realistic Solar Heating of Snow and Ice. Presented by M. Flanner to the American Geophysical Union Fall Meeting, San Francisco, CA, December 13–17, 2004. ([PDF](#))
- CM37. Flanner, M. G. and **C. S. Zender** (2004): Snowpack Radiative Heating: Effect on Snow Depth and Surface Reflectance. Presented by M. Flanner to the Workshop on EOS Snow and Ice Products, Raytheon Building, Landover, MD, November 16–17, 2004. ([PDF](#))
- CM36. **Zender, C. S.**, S. Bortz, and R. Arimoto (2003): Detection of the geographic distribution of source soil mineralogy in long range transported aerosol from Ca measurements and simulations in the Dust Entrainment And Deposition (DEAD) model. Presented to the American Geophysical Union Fall Meeting, San Francisco, CA, December 8–12, 2003.
- CM35. Bian, H. and **C. S. Zender** (2003): Global Ammonium Aerosol Chemistry and Distribution: Relationship to Sulfate, Nitrate, Seasalt, and Dust Aerosols. Presented to the 22nd American Association of Aerosol Research (AAAR) Conference, Anaheim, CA, October

- 20–24, 2003. ([PDF](#))
- CM34. Grini, A., and **C. S. Zender** (2003): Impact of different dust production mechanisms on downwind dust size distributions. Presented by A. Grini to the Second International Workshop on Mineral Dust, Paris, France, September 10–12, 2003. ([PDF](#))
- CM33. **Zender, C. S.**, and J. Talamantes (2003): Environmental factors controlling valley fever incidence in Kern County, California, USA. Presented to the Second International Workshop on Mineral Dust, Paris, France, September 10–12, 2003. ([PDF](#))
- CM32. **Zender, C. S.**, M. G. Flanner, and J. Adams (2003): LGM dust distribution and radiative forcing: Sensitivity to vegetation reconstruction. Presented to the XVI International Quaternary Association (INQUA) Congress, Reno, Nevada, July 23–30, 2003. ([PDF](#))
- CM31. Sweeney, M. R., A. J. Busacca, D. R. Gaylord and **C. S. Zender** (2002): Provenance of Palouse loess related to late quaternary glacial outburst flooding in the Pacific Northwest. Presented by M. Sweeney to the American Geophysical Union Fall Meeting, San Francisco, CA, December 10–14, 2002.
- CM30. **Zender, C. S.**, D. J. Newman, and O. Torres (2002): Spatial Heterogeneity in Aeolian Erodibility: Uniform, Topographic, Geomorphic, and Hydrologic Hypotheses. Presented to the American Geophysical Union Fall Meeting, San Francisco, CA, December 10–14, 2002. ([PDF](#))
- CM29. Bian, H., and **C. S. Zender** (2002): Mineral dust and global tropospheric chemistry: Relative roles of photolysis and heterogeneous uptake. Presented by H. Bian to the American Geophysical Union Fall Meeting, San Francisco, CA, December 10–14, 2002.
- CM28. **Zender, C. S.**, and D. J. Newman (2002): Spatial Heterogeneity in Global Soil Aeolian Erodibility: Dependence on Regional Topography, Geomorphology, and Hydrology. Presented to the Fifth International Conference on Aeolian Research (ICAR5) and Global Change & Terrestrial Ecosystem-Soil Erosion Network (GCTE-SEN) joint meeting, Lubbock, TX, July 22–25, 2002.
- CM27. **Zender, C. S.** (2002), Forcing and Feedback of Mineral Dust Aerosol in the NCAR CCSM. Presented at the Seventh Annual Community Climate System Model Workshop, Breckenridge, CO, June 25–27, 2002.
- CM26. Mahowald, N., C. Luo, **C. S. Zender**, and J. del Corral (2002): Interannual variability in mineral aerosol deposition to ocean regions from a 1979–2001 simulation. Presented by N. Mahowald to the Annual Meeting of the European Geophysical Society, Nice, France, April 21–26, 2002.
- CM25. Yu, S., **C. S. Zender**, and V. K. Saxena (2001): Direct radiative forcing and atmospheric absorption by boundary layer aerosol in the southeastern US: model estimates on the basis of new observations. Presented to the Chapman Conference on Solar Radiation, Estes Park, CO, August 13–17, 2001.
- CM24. Mahowald, N., C. Luo, and **C. S. Zender** (2001): Decadal Variability in Mineral Aerosols. Presented by N. Mahowald to the Eighth Scientific Assembly of the International Association of Meteorology and Atmospheric Sciences (IAMAS), Innsbruck, Austria, July 10–18, 2001.
- CM23. Ammann, C. M., J. T. Kiehl, B. L. Otto-Bliesner, **C. S. Zender**, and Raymond S. Bradley (2001): External forcing and 20th century climate in the CSM. Presented by C. Ammann to the Sixth Annual Community Climate System Model Workshop, Breckenridge, CO, June 25–27, 2001.

- CM22. Ammann, C. M., J. T. Kiehl, B. L. Otto-Bliesner, and **C. S. Zender** (2000): Contribution of Explosive Volcanism to the Global Warming Attribution in the 20th Century. Presented by C. Ammann to the Fall Meeting of the American Geophysical Union, San Francisco, CA, December 14–18, 2000.
- CM21. **Zender, C. S.** (2000), Implications of the Size-Resolved Distribution of African Mineral Dust Over the Tropical North Atlantic. Presented to the American Geophysical Union Fall Meeting, San Francisco, CA, December 14–18, 2000.
- CM20. Yu, S., **C. S. Zender**, and V. K. Saxena (2000): Aerosol direct radiative forcing in the southeastern US: estimates from measurement and model results. Presented by S. Yu to the 7th International Conference on Atmospheric Science and Applications to Air Quality (ASAAQ) Conference, Taipei, Taiwan, China, October 30–November 2, 2000.
- CM19. **Zender, C. S.** (2000): Mineral Dust Variability over the N. Atlantic and Indian Oceans. Presented at the Fifth Annual Community Climate System Model Workshop, Breckenridge, CO, June 27–29, 2000.
- CM18. Collins, W. D., P. J. Rasch, B. E. Eaton, D. W. Fillmore, J. T. Kiehl, and **C. S. Zender** (2000): Simulation of Regional Aerosol Distributions and Radiative Forcing for INDOEX. Presented by W. Collins to the XXV General Assembly, European Geophysical Society, Nice, France, April 25–29, 2000. EGS Newsletter, vol. 74, p. 189.
- CM17. **Zender, C. S.** (2000): Mineral Dust Aerosol over the N. Atlantic and Indian Oceans: Simulations, Evaluations, and links to Biogeochemistry. Presented to the NCAR Biogeochemistry Working Group Meeting, Boulder, CO, March 28–29, 2000.
- CM16. Collins, W. D., P. J. Rasch, D. W. Fillmore, **C. S. Zender**, J. T. Kiehl, and B. E. Eaton (2000): Direct radiative forcing and heating during INDOEX: Results from an aerosol analysis with assimilation. Presented by W. Collins to Fall Meeting of the American Geophysical Union. *Eos Trans. AGU*, vol. **80**(46), p. F183, 2000.
- CM15. **Zender, C. S.** (1999): Mineral Dust Shortwave Radiative Forcing. Presented to the Workshop on Mineral Dust, Boulder, CO, June 9–11, 1999.
- CM14. **Zender, C. S.** (1998): Tropospheric Mineral Dust: Observations and Implications. Presented to the Third Annual Climate System Model Workshop, Breckenridge, CO, June 22–24, 1998.
- CM13. **Zender, C. S.** (1998):  $O_2 \cdot O_2$  and  $O_2 \cdot N_2$ : Climatological Abundance, Forcing, and Response. Presented to the Third Annual Climate System Model Workshop, Breckenridge, CO, June 22–24, 1998.
- CM12. **Zender, C. S.** (1998):  $O_2 \cdot O_2$ ,  $O_2 \cdot N_2$ , and  $(H_2O)_2$ : Climatological Abundance, Forcing, and Response. Presented to the Gordon Research Conference on Solar Radiation and Climate, Plymouth, NH, June 15–18, 1998.
- CM11. **Zender, C. S.** and P. Chýlek (1998): A global climatology of  $O_2 \cdot O_2$ ,  $O_2 \cdot N_2$ , and  $(H_2O)_2$  abundance and absorption. Presented to the Eighth Atmospheric Radiation Measurement (ARM) Science Team Meeting, Tucson, AZ, March 23–27, 1998.
- CM10. **Zender, C. S.** (1998): Dust in the NCAR CSM: links to paleoclimate. Presented to the 1998 CSM Paleoclimate Working Group Meeting, Boulder, CO, February 17–18, 1998.
- CM9. **Zender, C. S.** (1997): The simulation of the global dust distribution in the NCAR CCM3. Presented to the American Geophysical Union Fall Meeting, San Francisco, CA, December 8–12, 1997.
- CM8. **Zender, C. S.**, B. Bush, S. K. Pope, A. Bucholtz, W. D. Collins, J. T. Kiehl, F. P. J. Valero,

- and J. Vitko, Jr. (1997): Atmospheric absorption during ARESE. presented to the Seventh Atmospheric Radiation Measurement (ARM) Science Team Meeting, San Antonio, TX, March 3–7, 1997.
- CM7. **Zender, C. S.** and J. T. Kiehl (1997): Tropical climate sensitivity to representation of cirrus anvil lifecycle. *Proceedings of the Ninth AMS Conference on Atmospheric Radiation*, pp. 111–114, American Meteorological Society Annual Meeting, Long Beach, CA, February 2–5, 1997
- CM6. **Zender, C. S.**, and J. T. Kiehl (1996): Climate sensitivity to tropical anvil representation. Presented to the Summer Workshop on Climate Modeling, Center for Clouds, Chemistry, and Climate, Scripps Institute of Oceanography, San Diego, CA, July 1996.
- CM5. **Zender, C. S.**, and J. T. Kiehl (1995): Parameterization of Anvil Clouds in the NCAR GCM. Presented to the American Geophysical Union Fall Meeting, San Francisco, CA, December 11–15, 1995.
- CM4. **Zender, C. S.**, and J. T. Kiehl (1995): Parameterization of Anvil Clouds in the NCAR GCM. Presented to the Cloud Modeling and Measurement Workshop, NOAA ERL, Boulder, CO, October 23–25, 1995.
- CM3. Kiehl, J. T., and **C. S. Zender** (1995): A prognostic ice water scheme for anvil clouds. Presented by J. T. Kiehl. In: *Proceedings of the Workshop on Cloud Microphysics Parameterizations in Global Atmospheric Circulation Models*, pp. 167–188, World Meteorological Organization, WCRP-90, WMO/TD-No. 713, Kananaskis, Alberta, Canada, May 23–25 1995.
- CM2. **Zender, C. S.**, and J. T. Kiehl (1994): The radiative influence of crystal habit and size in tropical anvils. In: *Proceedings of the Eighth AMS Conference on Atmospheric Radiation*, pp. 561–563, American Meteorological Society Annual Meeting, Nashville, TN, January 24–28, 1994.
- CM1. **Zender, C. S.**, and J. T. Kiehl (1993): Sensitivity of Modeled Cirrus Radiative Properties to Small Ice Crystals. Presented to the American Geophysical Union Fall Meeting, San Francisco, CA, December 6–10, 1993.

## THESIS ADVISOR AND POSTGRADUATE SCHOLAR SPONSOR

1. Chair or Co-Chair of Thesis committee: Dr. Scott Capps 3/05–11/09 (UCI, now postdoc at UCLA), Dr. Mark Flanner 3/03–6/07 (UCI, now professor at U. Mich.), Dr. Alf Grini 1/02–2/04 (U. Oslo, now private industry), Qin Han 3/05–present (UCI), Michael Tosca 7/06–present (UCI), Dr. Daniel Wang 10/05–11/08 (UCI, now at SLAC)
2. Member of Thesis committee: Ray Anderson 5/07–6/07 (UCI), Dr. Aaron Berg 12/01–8/03 (UCI, now professor at U. Guelph), Dr. Huisheng Bian 8/00–9/01 (UCI, now at NASA GSFC), Dr. Rick Hansell 9/05–12/07 (UCLA, now at NASA GSFC), Dr. Brian Kahn 10/03–4/05 (UCLA, now at NASA JPL), Dr. Aparna Krishnamurthy 6/06–6/09 (UCI, now in India), Calvin Liang 4/08–present (UCLA), MinHui Lo 5/07–present (UCI), Dr. Marco Rodriguez 1/02–3/04 (UCI, now at CSU CIRA)
3. Postdoctoral scholars supervised: Dr. Robert Allen 10/08–present, Dr. Huisheng Bian 10/01–9/03 (now at UMBC GEST/NASA GSFC), Dr. Xianwei Wang 6/08–present
4. Researchers supervised: Dr. Chao Luo 2/05–10/06 (now at UCSB/Cornell), Dr. Harry Mangalam 2/05–3/06 (now at UCI NACS), Dr. David Newman 11/01–4/03 (now at UCI ICS)

5. Software engineers supervised: Mr. Henry Butowsky 10/00–present, Mr. Pat Jones 6/01–10/01 (whereabouts unknown), Mr. Dan Stromberg 1/04–12/05 (whereabouts unknown)
6. Total number of graduate students supervised: 6.
7. Total number of postgraduate scholars sponsored: 3.

## STUDENT THESES

### T6. *Upcoming and subject to change:*

Michael G. Tosca (2011): Interactions between biomass burning and climate (ENSO). University of California, Irvine. Jointly supervised with ESS Prof. J. Randerson. ([PDF](#))

T5. Qin Han (2010): Constraining Oceanic Dust Deposition Using Surface Ocean Dissolved Al. University of California, Irvine. Jointly supervised with ESS Prof. J. K. Moore. ([PDF](#))

### T4. *Past:*

Scott B. Capps (2009): Surface Wind Speed Distributions: Implications for Climate and Wind Power. University of California, Irvine. ([PDF](#))

T3. Daniel L. Wang (2008): Compilation, Locality Optimization, and Managed Distributed Execution of Scientific Dataflows. University of California, Irvine. Jointly supervised with EECS Prof. S. Jenks. ([PDF](#))

T2. Mark G. Flanner (2007): Effects of Vertically-Resolved Solar Heating, Snow Aging, and Black Carbon on Snow-Albedo Feedback. University of California, Irvine. ([PDF](#))

T1. Alf Grini (2004): Natural Aerosols in the Global Atmosphere. University of Oslo. Jointly supervised with UO Prof. I. Isaksen. ([PDF](#))

## STUDENT AWARDS

8. Mike Tosca: NASA Earth and Space Science Fellowship (ESSF), AY 2008–11
7. Scott Capps: UCI School of Physical Sciences ARCS Foundation Scholar, AY 2007–09
6. Scott Capps: First Place Poster Presentation Award, AMS Air-Sea Interaction Conference, Portland, OR, 10/07
5. Scott Capps: Outstanding Contributions to the Department of Earth System Science, 2006
4. Mark Flanner: NASA Earth and Space Science Fellowship (ESSF), AY 2005–07
3. Mark Flanner: UCI Medal Award, 2005
2. Mark Flanner: Outstanding Student Presentation in Atmospheric Sciences Section, Fall AGU Meeting, San Francisco, CA, 12/05
1. Mark Flanner: Outstanding Presentation, UCI Institute for Geophysics and Planetary Physics

## OTHER GRADUATE RESEARCH SUPERVISION

3. Eun Young Kwon 3/03–12/03 (UCI, transfer)
2. Gayathri Venkitachalam 12/04–7/05 (UCI, withdrew)
1. Sarah Bortz 9/02–6/03 (UCI, transfer, withdrew)

## UNDERGRADUATE RESEARCH SUPERVISION

- U5. Soo Min Kim 6/09–7/09
- U4. Michael Brown 3/05–2/06 (SURF-IT)
- U3. Danielle Johnson 6/05–8/05
- U2. Stephen Bamattre 7/01–1/03 (UROP)

U1. Hyeryun Kim 5/00–6/01

**COURSES TAUGHT** (F, W, S = Fall, Winter, and Spring academic quarters of year YY)

1. ESS 5, The Atmosphere: S00\*, S01\*, S02\*, S03, S04, S05 (\*ESS 20E)
2. ESS 11, Climate Change and Policy: W06, W07
3. ESS H90, The Idiom and Practice of Science: Geoengineering: F08, F09
4. ESS 199, Undergraduate Research: S00, F00, S02, F02, S05, F05, W06
5. ESS 204B, The Planetary Boundary Layer: W04, W05, W06, W07
6. ESS 223, Earth System Physics: F02\*, F03<sup>†</sup>, F04<sup>†</sup>, F05<sup>†</sup>, F06<sup>†</sup>, F08<sup>†</sup>, F09 (\*ESS 201A, <sup>†</sup>ESS 200B)
7. ESS 236, Radiative Transfer & Remote Sensing: W01\* (\*ESS 111/211)
8. ESS 282, Topics in Climate: Aerosol-Cloud-Climate Interactions: W02\* (\*ESS 233)
9. ESS 282, Topics in Climate: Global Climate Modeling: F09
10. ESS 286, Topics in Biogeochemistry: Chemistry, Composition, and Climate: F02
11. ESS 286, Topics in Biogeochemistry: Land Surface Process Modeling: W03
12. ESS 291, Research Seminar: W06–present
13. ESS 298, Practicum in Earth System Science: S03, W10
14. ESS 299, Research: W02–present
15. College of the Atlantic, Bar Harbor, ME: Calculus I & II, Physics I: S91

**SPONSORED RESEARCH PROJECTS**

- G15. Co-PI NASA Earth and Space Science Fellowship (ESSF) for Mike Tosca: “Linking El Niño and biomass burning in a coupled feedback system”, (PI: Jim Randerson, UCI), \$72000, 9/1/2008–8/31/2010.
- G14. PI NSF grant jointly funded by Office of Polar Programs (OPP), Division of Arctic Sciences (ARC), Arctic Natural Sciences (ANS) Program and Directorate for Geosciences (GEO), Division of Atmospheric Sciences (ATM), Climate and Large-Scale Dynamics (CLD) Program ([ARC-0714088](#)): “Snow Process Studies and Modeling to Improve Arctic Climate Prediction” \$518482, 9/1/2007–8/31/2010.
- G13. PI NASA International Polar Year (IPY) ([IPY06 NNX07AR23G](#)): “Black Carbon Impacts on Cryospheric Climate Sensitivity and Surface Hydrology”, \$607000, 8/2/2007–8/1/2010.
- G12. Co-PI NSF Directorate for Geosciences (GEO), Division of Atmospheric Sciences (ATM), Biocomplexity in the Environment (BE) Program ([ATM-0628637](#)): “Collaborative Research: Fire at the Intersection of Global Carbon and Water Cycles”, (PI: Jim Randerson, UCI, four Co-PIs), \$595689, 10/1/2006–9/30/2010.
- G11. PI NASA Earth and Space Science Fellowship (ESSF) for Mark Flanner: “Climate Sensitivity To Snow Radiative Processes: Improving Physical Representation And Understanding With MODIS/MISR” \$48000, 9/1/2005–8/31/2007.
- G10. Co-PI UC Irvine CORCLR Multi-Investigator Faculty Research Grant: “Earth and Planetary System Science Game Engine (EPSS-GE)”, (PI: Falko Kuester, UCI, two Co-PIs), \$15250, 7/1/2005–6/30/2006.
- G9. Co-PI NSF Directorate for Geosciences (GEO), Division of Oceanography (OCE), Chemical Oceanography Program ([OCE-0452972](#)): “Global Atmospheric Nutrient Deposition and Ocean Biogeochemistry”, (PI: Keith Moore, UCI), \$499001, 3/15/2005–2/29/2009.

- G8. PI NSF Directorate for Geosciences (GEO), Division of Atmospheric Sciences (ATM), Small Grant for Exploratory Research (SGER) Program ([ATM-0503148](#)): “SGER: Improving CCSM Snow/Ice Radiative and Heating Processes and Assessing the Importance of the Soot Albedo Effect”, \$26828, 2/1/2005–1/31/2006.
- G7. PI NSF Directorate for Computer and Information Science and Engineering (CISE), Division of Information and Intelligent Systems (IIS), Science and Engineering Informatics (SEI) Program ([IIS-0431203](#)): “SEI(GEO): Scientific Data Operators Optimized for Distributed Interactive and Batch Analysis of Tera-Scale Geophysical Data”, \$594417, 9/1/2004–8/31/2008.
- G6. Co-PI NSF Directorate for Computer and Information Science and Engineering (CISE), Division of Computer and Network Systems (CNS), Major Research Instrumentation (MRI) Program ([CNS-0421554](#)): “HIPerWall: A High-Performance Visualization System for Collaborative Earth System Sciences” (PI: Falko Kuester, UCI), \$562190 (\$393533 NSF + \$168657 UCI), 9/1/2004–8/31/2007.
- G5. PI NSF Directorate for Geosciences (GEO), Division of Atmospheric Sciences (ATM), Major Research Instrumentation (MRI) Program ([ATM-0321380](#)): “Acquisition of an Earth System Modeling Facility for Coupled Climate, Chemistry, and Biogeochemistry Studies”, \$1105k (\$773543 NSF + \$332k UCI), 8/1/2003–7/31/2006.
- G4. PI NSF Directorate for Geosciences (GEO), Division of Atmospheric Sciences (ATM), Earth System History (ESH) Program ([ATM-0214430](#)): “Collaborative Proposal: Using Measurements from the Columbia Plateau Eolian System to Improve Global-Scale Models of Mineral-Dust Aerosols” (Collaborative with Alan Busacca, WSU, [ATM-0214508](#), \$311500), UCI share \$88395, 8/1/2002–7/31/2005.
- G3. PI UC Irvine Undergraduate Research Opportunity Program (UROP): “Contribution of Resonance Peaks to Aerosol Absorption”, \$400, 2002–2003.
- G2. PI NASA New Investigator Program (NIP) (NAG5-10546): “Influence of Mineral Dust Aerosol on the Chemical Composition of the Atmosphere”, \$330k, 1/1/2001–12/31/2004.
- G1. Co-PI NASA Interdisciplinary Science (IDS) (NAG5-10147): “Effects of land-use on climate and water resources: Application of a land surface model for land-use management” (PI: Gordon Bonan, NCAR), \$360k, UCI share \$60k, 1/1/2000–12/31/2002.

## PEER-REVIEWED COMPUTATIONAL RESOURCE GRANTS

- GC2. PI NCAR Computational & Information Systems Laboratory (CISL) support for NSF ([ATM-0628637](#)): “Collaborative Research: Fire at the Intersection of Global Carbon and Water Cycles”, (PI: Jim Randerson, UCI), 180,000 GAUs, 6/1/2009–9/30/2010.
- GC1. PI NCAR Computational & Information Systems Laboratory (CISL) support for NSF ([ATM-0628637](#)): “Collaborative Research: Fire at the Intersection of Global Carbon and Water Cycles”, (PI: Jim Randerson, UCI), 148,220 GAUs, 5/1/2007–2/28/2009.

## HONORS

- H4. Kavli Fellow, US National Academy of Sciences and Alexander von Humboldt Foundation of Germany: 2009, 2010
- H3. NASA New Investigator Program (NIP) Award, 1/01–12/04
- H2. Outstanding Contributions to Undergraduate Education Award, UC Irvine School of Physical Sciences, Department of Earth System Science, AY 2001-02

- H1. Outstanding Student Presentation in Atmospheric Sciences Section, Fall AGU Meeting, San Francisco CA, 12/95

## FELLOWSHIPS

- F6. Gaspar de Portolà Catalonian Studies Program Scholarly Exchange Fellowship, University of California, 2004  
F5. Advanced Study Program (ASP) Postdoctoral Fellowship, NCAR, 7/96–6/98  
F4. Graduate Fellowships, University of Colorado at Boulder, 1992–1994  
F3. NASA Earth Science Summer School Fellowship, La Jolla, CA, 6/92  
F2. IBM Thomas J. Watson Scholarship, Harvard University, 1982–1986  
F1. Summer Science Program (**SSP**), Ojai, CA, 1981

## MEMBERSHIPS

- M6. Global Change & Terrestrial Ecosystems (GCTE), Focus 3: Soil Erosion Network (SEN), 2003–present.  
M5. American Association for Aerosol Research (AAAR), 2003–2004.  
M4. NCAR CCSM Biogeochemistry Working Group, 2000–present.  
M3. NCAR CCSM Atmospheric Model Working Group, 1996–present.  
M2. American Meteorological Society (AMS), 1994–present.  
M1. American Geophysical Union (AGU), 1993–present.

## CONSULTING ACTIVITIES, GOVERNMENT AND INDUSTRY

- C15. Scientific Advisor, Long Beach [Aquarium of the Pacific](#) Science on a Sphere educational facility, 2009–present. (*pro bono*)  
C14. Panel reviewer for NASA MAP Program Clouds/Aerosols/Radiation Panel. November 19–21, 2008. (*pro bono*)  
C13. Consultant for the Institute of Governance and Sustainable Development (**IGSD**) on climate mitigation strategies and black carbon. October 6, 2008. (*pro bono*)  
C12. Consultant for [Earthjustice](#) on environmental impacts of black carbon emissions due to energy exploration and recovery in the Arctic, September 17, 2008. (*pro bono*)  
C11. Press conference ([Agenda](#)) panelist ([Statement](#), [Presentation](#)) The International Polar Year (IPY): from Greenland to Antarctica through Arctic dirty snow. Presented to the European Geophysical Union (EGU) Spring Meeting, Vienna, Austria, April 15, 2008. (*pro bono*)  
C10. Consultant to the Clean Air Task Force (**CATF**) on the effects of short-lived pollutants, especially black carbon aerosol, on Arctic climate (**SPAC**) 2007–present. (*pro bono*)  
C9. Expert witness ([Video](#), [Oral](#), [Written](#)) at the United States House of Representatives Oversight and Government Reform Committee hearing on Black Carbon and Climate. Washington, DC, October 18, 2007. (*pro bono*)  
C8. Reviewer for Prentice Hall “Understanding Weather and Climate” undergraduate text. 2007. (paid)  
C7. Dust consultant to US EPA Alaska Air Quality Workgroup. May 2, 2007. (*pro bono*)  
C6. Panel reviewer for NASA EOS Program Aerosol/Clouds Panel. March 19–21, 2007. (*pro bono*)  
C5. Panel reviewer for NSF CISE SEI Program GEO Panel. March 31–April 2, 2005. (*pro bono*)

- C4. Reviewer for Holt, Rinehart, and Winston “California Earth Science” middle-school texts. 2005. (paid)
- C3. Member, [California Climate Change Advisory Committee](#), 10/04–6/05. (*pro bono*)
- C2. Reviewer for Prentice Hall “Understanding Weather and Climate” undergraduate text. 2003. (paid)
- C1. US Advisor, International Science and Technology Center (ISTC) proposal #K-424, “Numerical Simulation of Aerohydrodynamic Problems of the Environment Aral Sea Region”. 2002–2004. (*pro bono*)

## **SERVICE TO PROFESSIONAL SOCIETIES AND CONFERENCE ORGANIZATION**

### SP13. *Upcoming and subject to change:*

Symposium Organizing Committee Member and Co-Convener (with Gregor Rehder), Earth Sciences Session: World Water Resources, Sixteenth Annual German-American Kavli Frontiers of Science ([GAFOS](#)) Symposium of the Alexander von Humboldt Foundation and the U.S. National Academy of Sciences, Potsdam, Germany, June 2–5, 2010.

SP12. Member, International Global Atmospheric Chemistry (IGAC) drafting committee for “Bounding the Role of Black Carbon in Climate”, University of Tokyo, January 25–28, 2010.

SP11. Participant, American Geophysical Union (AGU) Global Environmental Change (GEC) Focus Group pool of experts responding to Press questions during COP15 climate negotiations, December 7–18, 2009.

### SP10. *Past:*

Chair, Session 2a: Observations of Mineral Aerosol and Dust Storm Events, Chinese Academy of Sciences (CAS) - Third World Academy of Sciences (TWAS) - World Meteorological Organization (WMO) Forum (CTWF) International Workshop on Mineral Aerosol and Impacts on Climate and Environment, Lanzhou, China, August 17–19, 2009.

SP9. Co-Organizer (with Manuel Lerda and Gregor Rehder), Earth Sciences Session: Aeolian Dust—Generation, Transport, and its impacts on Climate and Biogeochemistry, at the Fifteenth Annual German-American Kavli Frontiers of Science ([GAFOS](#)) Symposium of the Alexander von Humboldt Foundation and the U.S. National Academy of Sciences, Irvine, California, June 5–7, 2009.

SP8. Lead Convener (with Mark Flanner, Joe McConnell, Jing Ming, and Tom Painter), Session C41: Snow and Ice Impurities: Chemical, Climate, and Hydrologic Significance, American Geophysical Union Fall Meeting, San Francisco, CA, December 15–19, 2008.

SP7. Lead Convener (with George Kallos, Andrea Flossmann, and Alcide Giorgio di Sarra), Symposium MS04: Mineral Dust Cycle and its Impact on Clouds and Radiation, 2007 Scientific Assembly of the International Association of Meteorology and Atmospheric Sciences (IAMAS), Perugia, Italy, July 2–13, 2007.

SP6. Editorial Advisory Board, *Eos Trans. American Geophysical Union (AGU)*, May 2007–February 2008.

SP5. Science Program Committee: Aerosol Workshop on Climate Prediction Uncertainties, Santa Fe, New Mexico, July 20–21, 2006.

SP4. Science Program Committee and Conference Rapporteur: 2nd International Conference on Global Warming and the Next Ice Age, Santa Fe, New Mexico, July 17–19, 2006.

SP3. Co-Convener (with Zev Levin and Zifa Wang), Symposium A5: Mineral Dust Processes from Microphysical to Climate Scales, 2005 Scientific Assembly of the International Asso-

ciation of Meteorology and Atmospheric Sciences (IAMAS), Beijing, China, August 2–11, 2005.

SP2. Co-Convener (with Ron Miller), Session A05: Constraining the Global Mass Distribution of Mineral Dust Aerosol, Spring Meeting of the American Geophysical Union and Canadian Geophysical Union, Montreal, Canada, May 17–21, 2004.

SP1. Co-Chair (with Itsushi Uno), Session 5: Regional and global dust modeling: emission, transport, deposition and associated effects at the Second International Workshop on Mineral Dust, Paris, France, September 10–12, 2003.

### **AD HOC SERVICE AS MANUSCRIPT REVIEWER AND PROPOSAL REFEREE**

SR2. Reviewed seventeen manuscripts and proposals between October 1, 2008 and September 30, 2009: *Atmos. Chem. Phys.* (1), *Atmos. Res.* (1), *Clim. Dyn.* (1), *J. Geophys. Res. Atmospheres* (2), NASA (MAP: CAR Panel) (7), NSF CAREER (1), NSF GEO CLD (2), NSF OPP (2)

SR1. Reviewed manuscripts and proposals for following agencies/programs and journals since career began: *Atmos. Chem. Phys.*, *Atmos. Res.*, *Clim. Dyn.*, CRDF, DOE (SciDAC SGER), *Eos* (Editorial Advisory Board), *Frontiers in Eco. Evol.*, *Geophys. Res. Lett.*, *Global Biogeochem. Cycles*, *Global Plan. Change*, *Int. J. Biometeorol.*, *J. Arid. Env.*, *J. Atmos. Ocean. Tech.*, *J. Atmos. Sci.*, *J. Climate*, *J. Environ. Qual.*, *J. Geophys. Res. Atmospheres*, *J. Geophys. Res. Solid Earth*, *Kuwait J. Sci. Eng.*, *Mar. Chem.*, *Mon. Weather Rev.*, NASA (ACRM, EOS: AC Panel 2007, ESDS SPG, GMAP, IDS, NIP, MAP, MAP: CAR Panel 2008, RSP, TCP, UARP), *Nature*, NERC (UK), NOAA (OAR, OGP), NSF (AGS/ATM-ACP,CLD; CAREER; CHE; EAR-GLD; MRI, OPP-ANT, SEI: GEO Panel 2007), *Proc. Natl. Acad. Sci.*, *Q. J. R. Meteorol. Soc.*, *Science*, *Tellus*, USGCRP/IPCC (TAR), USCCSP/IPCC (AR4)

### **PROFESSIONAL ON-LINE RESOURCES PRODUCED/EDITED/MAINTAINED**

SO6. Author/maintainer: Dust Entrainment and Deposition ([DEAD](#)) on-line model. 2002–present.

SO5. Author/maintainer: Freely Available Community Texts ([FACTs](#)). 1999–present.

(a) [Radiative Transfer in the Earth System](#)

(b) [Natural Aerosols in the Climate System](#)

(c) [Particle Size Distributions: Theory and Application to Aerosols, Clouds, and Soils](#)

SO4. Author/maintainer: Mineral Dust and Climate Bibliography ([PDF](#)). 1998–present.

SO3. Author/maintainer: of Enhanced Absorption Bibliography ([PDF](#)). 1997–present.

SO2. Co-author/maintainer: NCAR CCM Column Radiation Model ([CRM](#)). 1996–present.

SO1. Author/maintainer: netCDF Operators ([NCO](#)). 1995–present.

### **SERVICE TO CAMPUS**

SC5. University Corporation for Atmospheric Research (UCAR), Member Representative. UCI, AY 2002–present.

SC4. Academic Senate Cabinet, Member. UCI, AY 2005–07.

SC3. Academic Senate Council on Student Experience (CSE), Chair. UCI, AY 2005–07.

SC2. Academic Senate Council on Student Experience (CSE), Member. UCI, AY 2004–07.

SC1. Academic Senate Committee on Courses, Member. UCI, AY 2001–04.

## SERVICE TO SCHOOL

- SS3. Communications Task Force, Member. School of Physical Sciences (SPS), UC Irvine (UCI). AY 2008–present.
- SS2. Committee on Research, Member. SPS UCI, AY 2002–05.
- SS1. Instructional Computing Committee, Member. SPS UCI, AY 2002–05.

## SERVICE TO DEPARTMENT

- SD9. Earth System Modeling Facility (ESMF), Director. Earth System Science Department (ESS), UC Irvine (UCI), 2004–2009.
- SD8. Campuswide Honors Program (CHP) Faculty Liaison. ESS UCI, AY 2008–present.
- SD7. Center for International Education (CIE) Faculty Liaison. ESS UCI, AY 2008–present.
- SD6. Abrupt Climate Change faculty search committee, Member. ESS UCI, AY 2005–06.
- SD5. Representative to Academic Senate. ESS UCI, AY 2002–05.
- SD4. Course re-organization coordinator. ESS UCI, 2001–03.
- SD3. Seminar Coordinator. ESS UCI, AY 1999–00.
- SD2. Astrophysical Planetary and Atmospheric Sciences (APAS) Department, University of Colorado at Boulder (CU): Founder/Director of APAS Help Center, a free tutoring center for undergraduates. 1992–1995.
- SD1. Graduate student representative to United Government of Graduate Students (UGGS). APAS CU, AY 1991–93.

## COMMUNITY SERVICE & EDUCATION PRESENTATIONS

### SE17. *Past:*

- Presented “[Seeding a Cooler Climate with Ocean Winds, Waves, and Clouds](#)” ([Video](#)) to the [Aquarium of the Pacific](#), Long Beach, CA, September 9, 2009.
- SE16. Presented “[Our Sabbatical Year in France](#)” to the Ferons/Maddens third grade class at Vista Verde Elementary School, Irvine, CA, March 27, 2009.
- SE15. Presented “[Climate Change: Idyllwild’s Perspective](#)” to the [Idyllwild Speaker Series](#), Idyllwild, CA, February 18, 2009.
- SE14. Presented “[Polar Warming: Impure as the Driven Snow](#)” to the [Aquarium of the Pacific](#), Long Beach, CA, August 13, 2007.
- SE13. Presented “[Pretty, Nasty, Weather](#)” to the Vista Verde Elementary School first grade assembly, Irvine, CA, February 21, 2007.
- SE12. Presented “[Arctic Melt](#)” to the Osher Lifelong Learning Institute ([OLLI](#)), Irvine, CA, October 31, 2006.
- SE11. Presented “[Sunlight, Clouds, and Climate](#)” to the Osher Lifelong Learning Institute ([OLLI](#)), Irvine, CA, November 18, 2005.
- SE10. Presented “[The Sun and Climate](#)” to the UCI [FOCUS](#) (Faculty Outreach Collaborations Uniting Scientists, Students and Schools) program, Irvine, CA, August 1, 2005.
- SE9. Presented “The Scientific Consensus on Global Warming with a Southern California Perspective” to the Harbor Ridge Women’s Club, Newport Beach, CA, February 23, 2005.
- SE8. Presented “The Atmospheric Physics of Climate Change” to the Summer Science Program, Happy Valley School, Ojai, CA, July 17, 2004.

- SE7. Presented “The Scientific Consensus on Global Warming” to the Unitarian Universalist Church of Orange County, Costa Mesa, CA, August 18, 2004.
- SE6. Presented “Climate Change: A Southern California Perspective” to the Osher Lifelong Learning Institute ([OLLI](#)), Irvine, CA, February 27, 2003.
- SE5. Presented “Climate Change: A Southern California Perspective” to the Regent’s Point Retirement Community, Irvine, CA, February 2, 2003.
- SE4. Presented “Climate Change: A Southern California Perspective” to the Dartmouth Alumni Association of Orange County, Irvine, CA, March 13, 2002.
- SE3. Contributor to the Mathematics and Science Teachers Hotline (MAST) of the University of Northern Colorado, Greeley Colorado (800) 866-MAST. 1995–1999.
- SE2. Cosmic docent for public open house sky nights. [Sommers Bausch Observatory](#), University of Colorado at Boulder, 1991–1992.
- SE1. Cosmic docent for public open house sky nights. [Loomis-Michael Observatory](#), Harvard University, 1983–1984.